Notice of Allowability	Application No.	Applicant(s)	
	10/660,020	RANNEY, JEFFREY T.	
	Examiner	Art Unit	
	Krishnan S. Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *RCE of 1/12/06*.

2. ☒ The allowed claim(s) is/are *1,3-7 and 18-23; RENUMBERED 1-12*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☒ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☒ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael Donohue on 1/26/06.

The application has been amended as follows:

Claims were amended to remove certain antecedent basis problems.

The amended claims list follows starting on a fresh page below:

Amended Claims List

1. (Currently Amended) A nanofiltration system comprising:

a chromatographic unit having an input to receive a mixture of water, acid and sugar, the chromatographic unit being configured to perform a partial separation of acids and sugars and having a first output to supply the separated sugar and a second output ~~coupled to the input feed line~~ to supply a sugar-contaminated acid mixture;

a filtration chamber having an input connection and an output connection;

an input feed line coupled to the chromatographic unit second output and the filtration chamber input connection;

an output line coupled to the filtration chamber output connection;

a nanofiltration membrane positioned within the filtration chamber, the membrane having a first side in fluid communication with the input feed line to receive the sugar-contaminated mixture therefrom and a second side opposite the first side, the second side being in fluid communication with the output line, the membrane allowing passage of the acids in the mixture while substantially blocking passage of the sugars in the mixture; and

an evaporative acid processor coupled to the output line, the evaporative acid processor configured to receive dilute acid via the output line and to reconcentrate the acid using an evaporation process, wherein removal of sugars from the mixture prevents malfunctioning of the evaporative acid processor.

2. (Canceled)

3. (Previously Presented) The system of claim 1, further comprising a feedback line from the nanofiltration unit to the chromatographic unit, the feedback line returning concentrate sugar to the chromatographic unit for further separation.

4. (Currently Amended) The system of claim 1, further comprising:

a pre-filtration chamber having an input connection and an output connection~~.~~;

~~an input feed line containing a mixture of water, acids and sugars~~, ~~an~~ a pre-filtration chamber input feed line coupled to the pre-filtration chamber input connection;

~~an~~ a pre-filtration chamber output line coupled to the ~~second~~ input of the chromatographic unit; and

a pre-filter nanofiltration membrane positioned within the pre-filtration chamber, the pre-filter membrane having a first side in fluid communication with the pre-filtration chamber input feed line to receive the mixture therefrom and a second side opposite the first side, the pre-filter membrane allowing passage of the acids in the mixture from the pre-filter membrane first side to the pre-filter membrane second side while substantially blocking passage of the sugars in the mixture.

5. (Currently Amended) The system of claim 1, further comprising a sugar processing system coupled to ~~the first output of~~ the chromatographic unit first output to receive the separated sugar therefrom, the sugar processing system processing the sugar into a final product.

6. (Original) The system of claim 5 wherein the sugar processing system is a fermentation/distillation system and processes the sugar into ethanol.

7. (Original) The system of claim 5 wherein the sugar processing processes the sugar into a sweetener.

8-17. (Canceled)

18. (Currently Amended) A nanofiltration apparatus for processing acid used in biomass hydrolysis conversion and contaminated with sugar, the apparatus comprising:

a chromatographic unit having an first input to receive water and a second input to receive a mixture of water, acid used in the biomass hydrolysis process and sugar, the chromatographic unit performing a partial separation of acids and sugars and having a first output to supply the separated sugar and a second output to supply a mixture of water, partially purified acid, and sugar contaminant;

a filtration chamber having an input connection and an output connection;

an input feed line coupled to ~~the second output of~~ the chromatographic unit second output to receive the mixture of water, partially purified acid, and sugar contaminant, the input feed line coupled to the filtration chamber input connection;

an output line coupled to the filtration chamber output connection;

a nanofiltration membrane positioned within the filtration chamber, the membrane having a first side in fluid communication with the input feed line to receive the mixture of water, partially purified acid, and sugar contaminant therefrom and a second side opposite the first side, the second side being in fluid communication with the output line, the membrane allowing passage of the acids in the mixture from the membrane first side to the membrane second side while substantially blocking passage of the sugars in the mixture; and

an evaporative acid processor coupled to the output line, the evaporative acid processor configured to receive dilute acid via the output line and to reconcentrate the acid.

19. (Previously Presented) The apparatus of claim 18 wherein the acid is sulfuric acid.

20. (Previously Presented) The apparatus of claim 18, further comprising a feedback line in fluid communication with the membrane first side and coupled to the chromatographic unit second input.

21. (Previously Presented) The apparatus of claim 18, further comprising a sugar processing system coupled to the first output of the chromatographic unit to receive the separated sugar therefrom, the sugar processing system processing the sugar into a final product.

22. (Previously Presented) The apparatus of claim 21 wherein the sugar processing system is a fermentation/distillation system and processes the sugar into ethanol.

23. (Previously Presented) The apparatus of claim 18, further comprising an acid processing system coupled to the output line of the filtration chamber, the acid processing system comprising a thermal evaporative concentration system.

Allowable Subject Matter

Pending claims 1,3-7 and 18-23 are allowed.

The following is an examiner's statement of reasons for allowance: The closest reference is Lombard in view of Paananen'222. Lombard fails to teach the chromatographic unit. Applicant's 37 CFR 1.131 affidavit overcomes the Paananen reference.

Other references showing state of the art are: Paananen et al (US 2002/0169311), which teaches chromatography for sugar processing but does not teach nanofiltration. There is no motivation to combine this reference with Lombard. Kampen (US 5,177,008) teaches microfiltration, evaporation, chromatography and further evaporation for sugar processing, but no nanofiltration. There is no motivation in either reference to insert a nanofiltration step in the Kampen process between the chromatography and evaporation steps from the teaching of Lombard. Eroma, et al (US 2002/0164731) teaches nanofiltration, chromatography, and evaporation for production of alcohols from biomass, but they are taught as alternate processes among several other processes, not in the sequence as claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan S. Menon
Patent Examiner
1/26/06

JOHN KIM
Primary PATENT EXAMINER